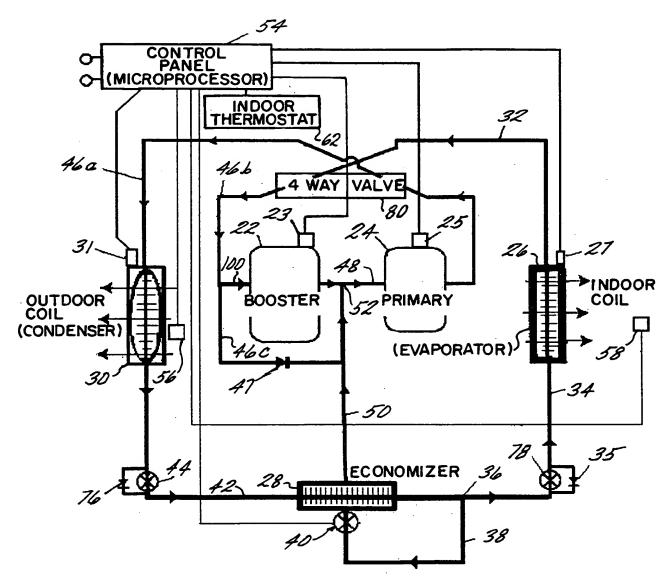


HEAT PUMP WITH BOOSTER COMPRESSOR

(HEATING FLOW PATH SHOWN)

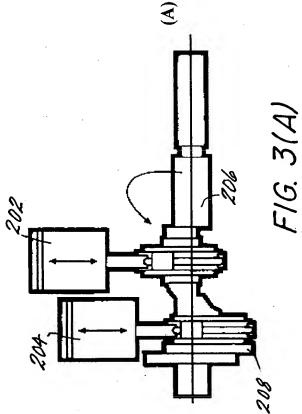
FIG. /



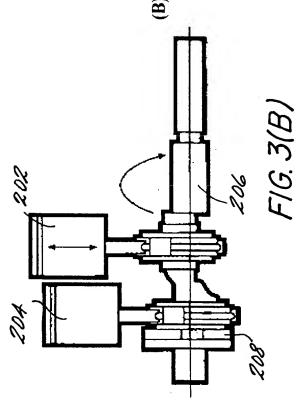
HEAT PUMP WITH BOOSTER COMPRESSOR

(COOLING FLOW PATH SHOWN)

F/G. 2



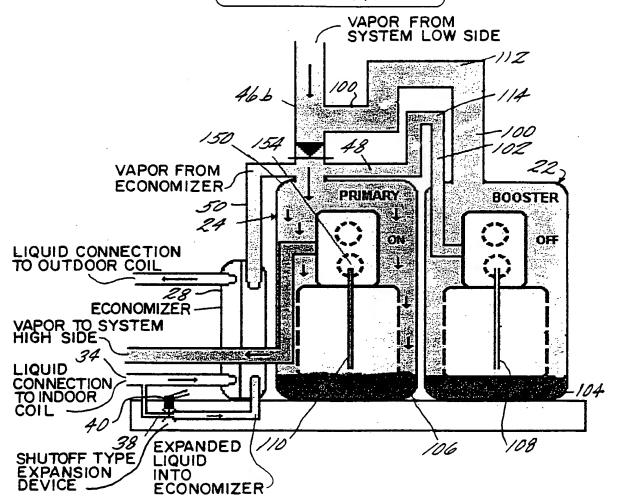
(A) Both pistons operate when the compressor runs forward.



(B) Reverse the motor, and just one piston operates, as the crankshaft lobe repositions itself on the center axis of the shaft.

COMPRESSION MODULE FOR BOOSTED AIR SOURCE HEATING

LIQUID CANNOT ENTER BOOSTER
WHEN ONLY PRIMARY IS OPERATIONAL
BECAUSE OF SHOWN LIQUID TRAPS

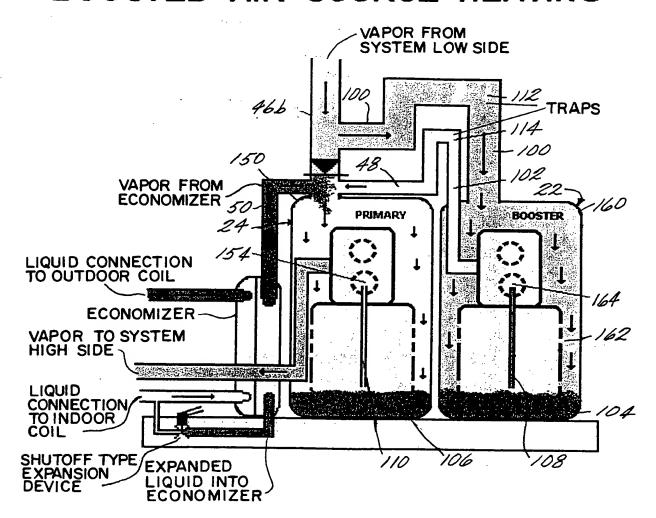


LOW LEVEL HEATING DEPICTED
ONLY PRIMARY COMPRESSOR OPERATIONAL

LUBRICANT MANAGEMENT

FIG. 4

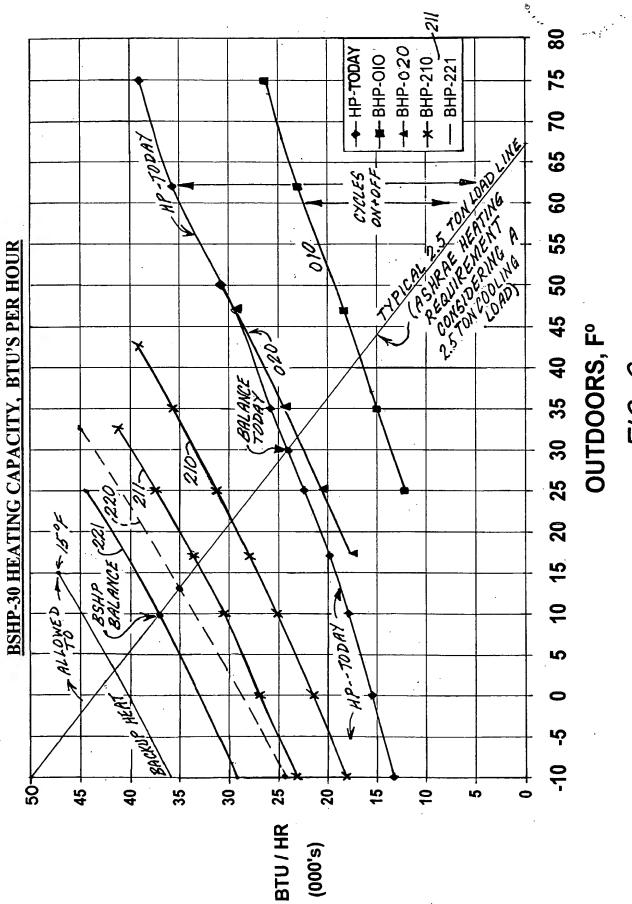
COMPRESSION MODULE FOR BOOSTED AIR SOURCE HEATING



HIGH HEATING DEPICTED
BOTH COMPRESSORS OPERATIONAL

LUBRICANT MANAGEMENT

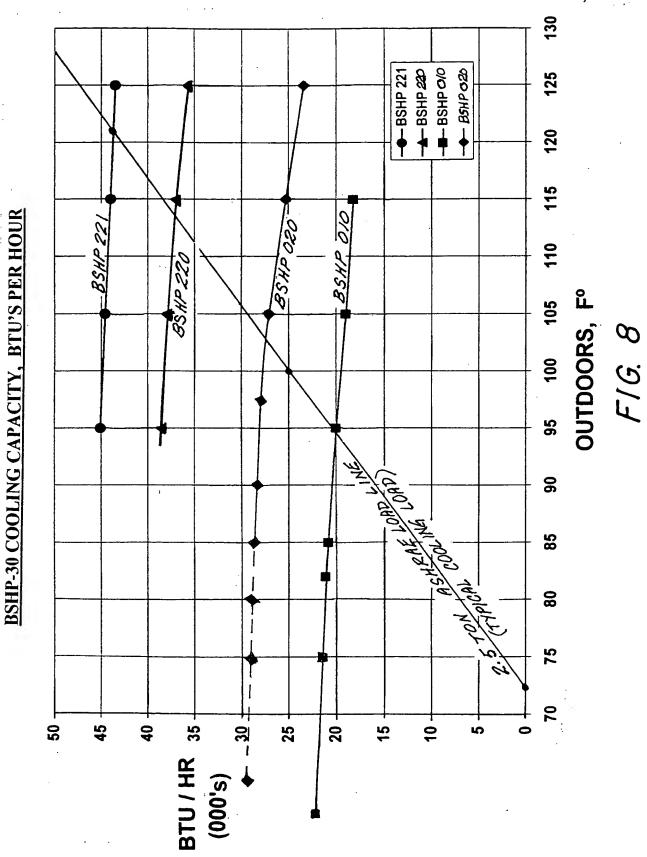
FIG. 5



F1G. 6

BOOSTED AIR SOURCE HEAT PUMP TYPICAL OPERATING SEQUENCE

TYPICAL" OUTDOOR AMBIENT TEMPERATURE RANGES.	THE CHART	SHOWN BELC	L. SMOHS MC	YPICALLY" A	LLOWED CA	PACITY STEP	THE CHART SHOWN BELOW SHOWS "TYPICALLY" <u>ALLOWED</u> CAPACITY STEPS FOR VARIOUS	S
NOT ALLOWED R CYLLS, 1 PRIMARY R CYLLS, 1 PRIMARY R CYLS, 2 PRIMARY R CYLS, 3 PRIMARY R CYLS, 4 PRIMARY		"TYPICAL" O	UTDOOR AM	BIENT TEMPE	RATURE RAN	IGES.		
NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED RECYLS., 1 PRIMARY RECOND PRIMARY	ALL	UP	ABOVE 15°	ABOVE 25°	ABOVE 33°	ABOVE 43°	ABOVE 50°	
NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED RECKENED IN BOXE RECKLS., 1 PRIMARY	ALLOWED	TO	ТО	TO	TO	10	TO	
NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED ROXENED IN BOXE ACKENED IN BOXE R CYLS., 1 PRIMARY R CYLS., 1 PRIMARY R CYLS., 1 PRIMARY R CYLS., 2 PRIMARY R CYLS., 2 PRIMARY R CYLS., 2 PRIMARY R CYLS., 3 PRIMARY R CYLS., 3 PRIMARY R CYLS., 2 PRIMARY R CYLS., 3 PRIMARY R CYLS., 4 PRIMARY	STEPS	15°F	25⁰F	33°F	43°F	50°F	75°F	
NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED ROTE STORY ROTE STORY RECYLS., 1 PRIMARY RECYLS.								
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NOT ALLOWED RCKENED IN BOXES ARE ALLOWED NS 1 PRIMARY CYLINDER; 0-2-0 M R CYLS., 1 PRIMARY CYLINDER.								
NOT ALLOWED SECOND PRIMARY CYLINDER: 0-2-0 MR CYLS., 1 PRIMARY CYLINDER.								
NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED SOTHE SHOW TO THE SHOW TO T	OMB. 2-2-1			NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	
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NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT	OMB. 2-1-1				NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	
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NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED IN DOXES ARE ALLOWED FOR THE SHOWN TEMPERATURE RANGES. ACKENED IN BOXES ARE ALLOWED FOR THE SHOWN TEMPERATURE RANGES. R CYLS., 1 PRIMARY CYLINDER; 0-2-0 MEANS BOTH PRIMARY CYLINDERS; 2-1-0 MEANS R CYLS, 1 PRIMARY CYL. & NO ECONOMIZER; 2-1-1 ADDS THE ECONOMIZER; 2-1-2 MEANS SECOND PRIMARY CYLINDER.								
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DMB. 0-1-0 NOT ALLOWED FOR THE SHOWN TEMPERATURE RANGES. O-1-0 MEANS 1 PRIMARY CYLINDER; 0-2-0 MEANS BOTH PRIMARY CYLINDERS; 2-1-0 MEANS 2 BOOSTER CYLS., 1 PRIMARY CYL. & NO ECONOMIZER; 2-1-1 ADDS THE ECONOMIZER; 2-2-1 ADDS THE SECOND PRIMARY CYLINDER.	JMB. 0-2-0	NOT ALLOWED	NOT ALLOWED				NOT ALLOWED	
OFF O1-0 MOT ALLOWED NOT ALLOWED NOT ALLOWED OFF ONLY BLACKENED IN BOXES ARE ALLOWED FOR THE SHOWN TEMPERATURE RANGES. 0-1-0 MEANS 1 PRIMARY CYLINDER; 0-2-0 MEANS BOTH PRIMARY CYLINDERS; 2-1-0 MEANS 2 BOOSTER CYLS, 1 PRIMARY CYLINDER. ADDS THE SECOND PRIMARY CYLINDER.								
OFF OHOT ALLOWED NOT ALLOWED NOT ALLOWED NOT ALLOWED OFF OHLY BLACKENED IN BOXES ARE ALLOWED FOR THE SHOWN TEMPERATURE RANGES. 0-1-0 MEANS 1 PRIMARY CYLINDER; 0-2-0 MEANS BOTH PRIMARY CYLINDERS; 2-1-0 MEANS 2 BOOSTER CYLS, 1 PRIMARY CYLINDER. ADDS THE SECOND PRIMARY CYLINDER.								
OFF ONLY BLACKENED IN BOXES ARE ALLOWED FOR THE SHOWN TEMPERATURE RANGES. 0-1-0 MEANS 1 PRIMARY CYLINDER; 0-2-0 MEANS BOTH PRIMARY CYLINDERS; 2-1-0 MEANS 2 BOOSTER CYLS., 1 PRIMARY CYL. & NO ECONOMIZER; 2-1-1 ADDS THE ECONOMIZER; 2-2-1	OMB. 0-1-0	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED			Share .	
OFF ONLY BLACKENED IN BOXES ARE ALLOWED FOR THE SHOWN TEMPERATURE RANGES. 0-1-0 MEANS 1 PRIMARY CYLINDER; 0-2-0 MEANS BOTH PRIMARY CYLINDERS; 2-1-0 MEANS 2 BOOSTER CYLS., 1 PRIMARY CYL. & NO ECONOMIZER; 2-1-1 ADDS THE ECONOMIZER; 2-2-1								
ONLY BLACKENED IN BOXES ARE ALLOWED FOR THE SHOWN TEMPERATURE RANGES. 0-1-0 MEANS 1 PRIMARY CYLINDER; 0-2-0 MEANS BOTH PRIMARY CYLINDERS; 2-1-0 MEANS 2 BOOSTER CYLS., 1 PRIMARY CYL. & NO ECONOMIZER; 2-1-1 ADDS THE ECONOMIZER; 2-2-1	0.55							
0-1-0 MEANS 1 PRIMARY CYLINDER; 0-2-0 MEANS BOTH PRIMARY CYLINDERS; 2-1-0 MEANS 2 BOOSTER CYLS., 1 PRIMARY CYL. & NO ECONOMIZER; 2-1-1 ADDS THE ECONOMIZER; 2-2-1 ADDS THE SECOND PRIMARY CYLINDER.	ONLY BLAC	KENED IN BOX	ES ARE ALLOWI	ED FOR THE SH(OWN TEMPERA	TURE RANGES.		
0-1-0 MEANS 1 PRIMARY CYLINDER; 0-2-0 MEANS BOTH PRIMARY CYLINDERS; 2-1-0 MEANS 2 BOOSTER CYLS, 1 PRIMARY CYL. & NO ECONOMIZER; 2-1-1 ADDS THE ECONOMIZER; 2-2-1 ADDS THE SECOND PRIMARY CYLINDER.								
ADDS THE SECOND PRIMARY CYLINDER.	0-1-0 MEANS 2 BOOSTER (1 PRIMARY CYL 3YLS., 1 PRIMAF	LINDER; 0-2-0 M 3Y CYL. & NO EC	EANS BOTH PRICONOMIZER; 2-	IMARY CYLINDE 1-1 ADDS THE E	CONOMIZER; 2	4S	
	ADDS THE S	ECOND PRIMAR	Y CYLINDER.					



COOLING CONDITIONS

BOOSTED AIR SOURCE HEAT PUMP TYPICAL OPERATING SEQUENCE

THE CHART SHOWN BELOW SHOWS "TYPICALLY" <u>ALLOWED</u> CAPACITY STEP VARIOUS "TYPICAL" OUTDOOR AMBIENT TEMPERATURE RANGES.

ALL ALLOWED STEPS	ABOVE 105° TO 125°F	ABOVE 85° TO 105°F	60°F. TO 85°F
	(MANUAL)		
COMB. 2-2-1		NOT ALLOWED	NOT ALLOWED
		(MANUAL)	
COMB. 2-2-0			NOT ALLOWED
COMB. 0-2-0			(MANUAL)
COMB. 0-1-0	NOT ALLOWED		
OFF			

ONLY BLACKENED IN BOXES ARE ALLOWED FOR THE SHOWN TEMPERATURE RANGES.

0-1-0 MEANS 1 PRIMARY CYLINDER; 0-2-0 MEANS BOTH PRIMARY CYLINDERS; 2-2-0 MEANS 2 BOOSTER CYLS., 2 PRIMARY CYL. & NO ECONOMIZER; 2-2-1 ADDS THE ECONOMIZER.

(MANUAL) MEANS THAT THE OPERATING STEP SHOWN MUST BE CALLED MANUALLY FOR THE SHOWN OPERATING TEMPERATURE RANGE.